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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/636,154	08/07/2003	Sunny Wu	67,200-1141	1812

EXAMINER	
KACKAR, RAM N	

ART UNIT	PAPER NUMBER
1792	

MAIL DATE	DELIVERY MODE
10/31/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/636,154	WU ET AL.	
	Examiner	Art Unit	
	Ram N. Kackar	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 September 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4,7,9,21,22,24-28 and 31-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-2, 4, 7, 9, 21-22, 24-28 and 31-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-2, 4, 7, 9, 21-22, 24-28 and 31-38 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In this instance the limitation "so as to produce a desired spatial distribution of said second RF power across said process wafer face in response to determining a density uniform deposition and/or etch rate over of said plasma across over said process wafer face" in claims 1, 33 and 36 is a new matter. The specification does not provide an enabling disclosure for measuring a spatial etch rate or spatial deposition rate to enable corresponding spatial RF power to compensate for non-uniformity. To the extent the limitation points to real-time feed back control of spatial processing, the measurement must be spatial in real-time. It is not clear how etch rate and deposition rate are measured by the claimed invention.

In addition, the limitation of electrostatic chuck being monopolar in claims 37 and 38 is also a new matter. The specification in paragraph 03 describes ESC comprising two electrodes powered by a voltage difference.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claims 1-2, 4, 7, 9, 21-22, 24-28 and 31-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dible et al (US 6239403) in view of Liu et al (US 2003/0038112).**

Dible et al disclose a method of controlling the RF power to a multi-segmented electrodes incorporated in an electrostatic chuck (Fig 2 and 5 and Col 2 lines 10-20) with a single RF power supply which delivers individually controlled power to different concentric electrode zones by controlling variable capacitors so as to have a localized control of plasma density in response to installed sensors (Abstract, Col 1 lines 7-14, Col 3 lines 32-47, Col 4 lines 19-25, Col 5 lines 37-58 and Col 6 lines 13-22) in order to have uniform processing (Abstract). Dible teaches impedance matching when applying an RF power (Col 1 lines 41-49) and teaches specific matching requirement for this method (Col 5 lines 16-36). Further, Dible et al teach that dual frequency generation of RF power (Col 1 lines 16-35) where the two frequencies may be combined for better process uniformity is known in the prior art. Regarding the electrostatic chuck being monopolar, it is noted that the electrostatic chuck in this instance could be powered either way (See Fig 2-28 and its description Col 5 lines 48-51).

Dible does not specifically disclose sensing spatial plasma density or etch rate in order to control individual power to electrode segments.

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Liu et al disclose a method of controlling the RF power to a multi-segmented electrode in a plasma chamber (Fig 1, 2A, 2B and 2C) with independent RF power supplies delivering individually controlled power to different concentric electrode zones through matching networks, so as to have a localized control of plasma density in response to installed sensors (Abstract and Paragraphs 5-7, 27, 40, 42 and 81). Liu et al teach measurement of spatial etch rate by detecting emission lines corresponding to etched by-product at each spatially located sensor (Paragraph 77). Further, Liu et al teach impedance matching when applying an RF power (Paragraph 7) and disclose uniformity of processing (Paragraph 15, 42, 68) and plasma uniformity (Paragraph 84).

It is noted that even though in Liu et al, upper electrodes are segmented, this teaching properly applies to Dible et al since the effect is same. That is why in Dible et al there is no significance given to which electrode, upper or lower is segmented.

Reversal (*In re Gazda* 104 USPQ 400 (CCPA 1955)) or rearrangement (*In re Japikse* 86 USPQ 70 (CCPA 1950)) of parts was held to have been obvious.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to incorporate plasma sensors in the apparatus of Dible et al for process and plasma uniformity or incorporate electrostatic chuck in the apparatus of Liu et al as conventional method of substrate chucking.

5. Claims 1-2, 4, 7, 9, 21-22, 24-28 and 31-38 are also rejected under 35 U.S.C. 103(a) as being unpatentable over Dible et al (US 6239403) in view of Liu et al (US 2003/0038112) and further in view of Strang (US 6642661).

Dible et al teach dual frequency generation of RF power (Col 1 lines 16-35).

In addition, Strange discloses dual frequency system where one frequency is applied to lower electrode and second frequency is applied to upper electrode through matching networks.

Therefore having dual frequency system as per the teaching of Strange for its specific advantage would have been obvious to one of ordinary skill in the art at the time of invention.

Response to Arguments

Applicant's arguments filed 9/14/2007 have been fully considered but they are not persuasive.

Applicant argues that this embodiment (Dible et al) is disclosed to be an upper electrode not a substrate support or not comprising an electrostatic chuck.

This argument is not understood, since as stated above, Dible et al does disclose support electrode comprising electrostatic chuck and electrode segments.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ram N. Kackar whose telephone number is 571 272 1436. The examiner can normally be reached on M-F 8:00 A.M to 5:P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571 272 1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Ram Kackar

Primary Examiner AU 1792